PRELIMINARY REPORT

UPON

THE GEOLOGICAL SURVEY

OF 1867.

BY ALEXANDER MURRAY, ESQ.

ST. JOHN'S, N. F.
PRINTED BY R. WINTON.
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PRELIMINARY REPORT

Of A. Murray, Esq., on his Geological Survey of 1867.

St. John's, Newfoundland,
1st March, 1867.

May it please Your Excellency,—

I have the honor to furnish you with the following narrative of my proceedings in the prosecution of the Geological Survey of the Island during the past season, preliminary to a more detailed report which, in due course, I shall be prepared to present through Sir W. E. Logan.

As in the course of my investigations it was necessary to visit places on the coast remotely distant from each other, with which there was no direct communication, it was deemed expedient that I should be supplied with a small vessel for that purpose, and accordingly the schooner "A. M. W.," of Harbor Grace, with a crew of four men, was placed at my disposal.

After some little unavoidable detention in fitting out the vessel, I sailed from St. John's on the 4th July, and returned thither on the 21st November, 1866.

The plan of the expedition was (as already intimated by Sir. W. E. Logan, in his letter to the Hon. F. Carter, accompanying my report to him or the year 1864,) to follow out the limits and distribution of the coal formation, which had been partially examined last year, and to trace out any workable seams that might be met with; at the same time to take particular note of the older formations at the various parts that might be visited, in order to be the better prepared to follow out their distribution at a future time.

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In connection with the examination a considerable amount of topographical surveying was required, there being no recently published charts of those parts of the Western Coast which were likely to be convenient as starting points; I therefore deemed it necessary to supply myself with a good chronometer for the purpose of ascertaining longitude from time to time, by means of which, with latitude found by observations of the sun or a star, the position of such places might be laid down with some degree of accuracy.

The earlier part of the season was devoted to an examination of the Coast between Cape Ray and Cape Anguille, where a good section of the coal formation was obtained, and a survey was made of the Great Codroy River and Valley; I then proceeded to the Bay of Islands, examined the Coast between Cape St. George and Round Head on the way, and commencing in Humber Arm, surveyed the main River and Valley for about 50 miles up its course, by which I was enabled to connect the work of the present with that of last year. Lastly—I repaired to the Bay of St. George with the intention of extending my survey from the South Coast of the Bay by the valleys of the various brooks, so as to connect that part with the survey of the Great Codroy; thereby also obtaining a transverse section of the coal measures of that region. This part of my plan was but partially accomplished, as I only succeeded in surveying the Flat Bay; at the same time, fixing the position of the most conspicuous mountains to the Southward by triangulation, and scaling two of the streams, viz., the Barachois and Flat Bay Brooks.

My operations during a considerable part of the season, and particularly while in St. George's Bay, were materially retarded in consequence of a very serious accident which I had the misfortune to meet with while examining the cliffs near Cape St. George, by which I was rendered incapable of walking without assistance, and had to limit my investigation to such places as were more or less accessible by a boat or canoe.—Under these circumstances I was with the greatest reluctance compelled to abandon my intended visit to the spot where a three-foot seam of coal is represented to exist by Mr. JUKES, in his work on the Geology of Newfoundland, and which I had resolved to examine and trace to its furthest limits, in order to ascertain whether or not it was likely to prove of commercial importance.

Previously to sailing from St. John's, I visited Topsail and Kelly's Island in Conception Bay, for the purpose of ascertaining the relation between the rocks which form the lofty cliffs of the main land there,

and those of the sea coast and the group of islands: a subject which may probably turn out to be one of paramount importance when further investigated, in revealing the geological structure of the Island.

A very good section of the more recent formation was obtained on Manuel's Brook, at Topsail Head, and at Kelly's Island; but the obscurity or absence of organic remains renders it still unadvisable to express too decided an opinion as to the horizon to which they belong, or the age of the series upon which they repose unconformably.*

Returning from the westward, several parts of the Southern Shore were visited, and every possible opportunity taken to obtain information respecting mineral indications and the character of the rocks with which they were associated. Thus some considerable time was occupied in Hermitage Bay and Bay Despair, where I was much indebted to Mr. Bradshaw, Collector of Customs at Gaultois, for assistance; and finally the season was concluded by visiting the La Manche Lead Mine, near the head of Placentia Bay, touching at Burin, Isle Valen, and other parts on the western side of the Bay, on the way thither.

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*Since the above was written a fossil has been placed in my hands by C. F. Bennett Esq., which is said to have been found by Mr. A. Harvey of this place, on the larger Belle Isle in Conception Bay. A photograph of this fossil was forwarded to E. Billings, Esq., Palæontologist of the Geological Survey of Canada, who at once recognised it to be "Cruziana Semiplicata" (Salter), a form characteristic of the ~~singulus~~ flags near the extreme base of the Silurian system. /Lingula

Geographical Description of the Great Codroy River.*

The Great Codroy River runs into the sea in lat. 47° 50' 14", long. 59° 19' 55", between fifteen and sixteen miles north from Cape Ray, and about six miles south-easterly from Cape Anguille. The entrance from the sea is very narrow, passing between banks of sand and gravel, and several bars and reefs of the same material stretch outwards to a considerable distance, which moreover are frequently shifted in position by the violence of the storms from without by which they are assailed, rendering the approach even for small craft very difficult and dangerous; although when once inside there is an excellent harbour, sheltered thoroughly from all weather.

Measuring from the lower part of the estuary, a little way North from the point where the latitude and longitude were ascertained, (*see plan*) the general courses ascending the river are as follows:—

	Miles	Ch'ns		Rise.
1st reach, N. 81° E.	6	"	to head of estuary or lagoon . . .	Tidewater
2nd reach, N. 55 E.	8	60	to the lower main fork, (say) . .	18 feet
3rd reach, N. 53 E.	4	60	to second main fork, ...	15 "
4th reach, N. 86 E.	3	25	to the end of survey, ...	12 "

The lower part of the 1st reach is wide and open, but flat and shallow over the whole area, except where the main channel cuts through, where there is sufficient water to float vessels of considerable size for upwards of three miles, when high tide. The upper part of the same reach also spreads over a large space, but it includes some low Islands which extend nearly to the point where the current of the river becomes perceptible.

The second reach is more or less rapid, and at a little over four miles up it, or about half way to the lower main fork, there is a little fall of about 2 feet; the total rise on the whole reach being estimated to be about 18 feet. At the head of this reach the river is split into two streams, of about equal size, the one turning a little North towards the Anguille range of hills for about 3 miles, after which it bends again to the Eastward at the Southern base of these hills, and runs parallel to them; while the other bears upwards on the third reach in nearly the same course as before, gradually approaching the Cape Ray or Long Range of mountains,

* All the bearings are from the true Meridian.

which it enters on the 4th reach above the second large fork. The second fork joins the main river on the south side, proceeding from a gorge of the Cape Ray mountains, at about one mile distant from it. Between the 1st and 2nd forks the main river was estimated to fall at the rate of about three feet in a mile, making a total of about 15 feet, and the upper reach, where it becomes a mountain torrent at the rate of about 4 feet, giving about 12 feet more to the end of the survey; thus giving a rise in the measured length of the stream of about 45 feet.

Besides the forks already mentioned there are numerous tributaries to this river falling in on either side, among the most important of which there are two in the lower reach on the north side, flowing from the Anguille range; one opposite the 1st. fork, at the head of the 2nd. reach falling from the Cape Ray mountains, and one coming in opposite the 2nd. fork at the head of the 3rd. reach, which proceeds from north eastward. The stream at the time of my visit was low, and the measurements had to be made on foot all the way, but when well supplied with water it is easily navigable for canoes up to the second fork.

On the coast, four miles south from the outlet of the Great Codroy River, is Larkin Point, immediately south of which the waters of the Little Codroy River are poured into the sea.

This stream runs parallel to, and not far from the north-western base of the Cape Ray range for the whole or greater part of its course, receiving many tributary streams from the mountains on its way. Above the estuary, at its mouth, it is very shallow and rapid, and inaccessible for canoe navigation.

The Cape Ray mountains, which bound the fine valley drained by these two streams on the South-east side, are bold, bare, barren and picturesque, but they nowhere attain an elevation much above two thousand feet, and are for the most part, according to measurements made both by triangulation and barometrical observations, considerably below that altitude. On the other hand the Cape Anguille range, which bounds the valley on the northern side, presents a soft and gentle outline, where the higher elevations attain an altitude of from one thousand to thirteen hundred feet, richly covered by forest trees nearly to the summits.

The flat or low land, forming the lower part of the valley between the two ranges of hills, extends on the sea coast from the neighbourhood of Trainvain Brook, three miles South from the mouth of little Codroy River, to within a short distance of Cape Anguille, giving a breadth of twelve statute miles; but the hill ranges converging slightly towards each other in

their North eastern course into the interior, the valley gradually becomes more and more contracted in width until shut in nearly altogether, where the main stream at the end of the survey becomes split up among the mountains of the long range into a succession of small turbulent mountain brooks.

The area occupied by level or gently undulating land in the valley amounts by rough measurement on the plan to about 75 square miles, or 48,000 square acres, a very large proportion of which is available for settlement. For the most part the country is well wooded with stout mixed timber, consisting chiefly of Spruce, Balsam-firs, Yellow Birch frequently of large size, White Birch and Tamarack; but there are also frequent spots of barren or spongy marsh entirely void of timber or only maintaining a very stunted growth of evergreens or small tamarack bushes. The Islands and flats of the lower part of the Great Codroy River yield a luxuriant growth of wild grass, affording an ample supply of admirable fodder for cattle. Along the sea coast, between Trainvain Brook and the little village of Codroy, the country is partially settled all the way, the attention of the settlers being about equally divided between the cultivation of the land and fishing operations; but up the Great Codroy River, which is more or less occupied on either side of the estuary, the calling of the inhabitants appears to be more nearly purely agricultural, and it may be fairly stated that, nothwithstanding the very rude process by which the land is cultivated, the crops produced of grass, grain and roots, highly testify to the excellence of the soil in which they are grown. Cattle and sheep are raised upon most of these small farms, producing most excellent beef and mutton, besides dairy produce of the very best description.

The greater portion of the Anguille, and some portions of the lower slopes of the Cape Ray ranges also, are quite capable of improvement, and if cleared of timber and sown in grass, would afford grazing land not easily surpassed in any country.

St. George's Bay and Coast to Humber Arm, Bay of Islands.

While examining this part of the Western Shores, I took every available opportunity of getting astronomical observations in order to correct as far as possible certain discrepancies suspected to exist in the published charts. The result has proved of importance, as a very considerable error in both latitude and longitude was found to exist in the representation of a great part of St. George's Bay, and the Bay of Islands.

These corrections must be taken only as approximative, but as the geographical position, found by the observations taken at one or two well marked places, very nearly coincided with those determined by Captain S. Cloue of the French Imperial Navy (whose admirable and well known accuracy requires no comment), they may be taken as moderately trustworthy. St. George's Harbour, the only harbour in the Bay, was one of the ports found to be very inaccurately represented not only as regards geographical position, but in the contour of the coast, so that it was deemed necessary to triangulate the whole of Flat Bay in order to get sufficiently accurate data to start with before fixing the position of the mountains and rivers of the interior. Harbor or Sandy Point, at the entrance to Flat Bay, is in latitude 48° 27' 27" N. and longitude 58° 30' 30" W. It is the termination of a long low spit of gravel and sand, projecting from the mainland for nearly six miles, and enclosing Flat Bay and St. George's Harbor. There is an excellent and secure anchorage for vessels of nearly all sizes immediately under this point, and a moderately deep although somewhat tortuous and narrow channel runs up nearly the whole length of Flat Bay, but all the rest of its area is exceedingly shallow, much of it being entirely dry at low ebb tides.

A stream known as the Barrachois brook falls into the sea a little way outside of Flat Bay, the entrance being about S. E. of Harbor Point, and another of about equal size, called the Flat Bay brook, falls in near the head of Flat Bay. Both these streams were found to be navigable for canoes for a considerable distance.

The course of the Barrachois in a general bearing is N. 65° E. for eight and quarter miles, at which distance it opens out into a suite of small

lakes at the base of the long range of mountains, bearing upwards on the same course for about two and a half miles more, then turning sharply to the southward, the upper lake lies for nearly two miles transversely across the hill range, and contracts again at the end of that distance in a narrow and rapid mountain brook. The Flat Bay brook bears upwards on its general course S. 76° E., seven miles 60 chains, through an undulating country to the mountain range which it intersects through a narrow gorge at that distance, still maintaining the same upward bearing for some four or five miles more in a narrow mountain valley, receiving numerous tributary streams on either side.

The stream is very rapid from the outlet to the mountains, but after entering the gorge the current becomes moderate, as far as it was ascended. At the point where the main stream enters the mountain gorge it is joined by a tributary on the right side flowing from the south-eastward, in the forks of which stands a remarkable and prominently conspicuous hill, which was termed the Cairn Mountain, from the circumstance of a monument having been erected on it, which afforded an excellent object for triangulation. The summit of this mountain where the monument stands was found to be ten hundred and twelve feet above the level of the sea. The north-western flank of the long range of mountains will thus be seen to run in a nearly straight direction, about N. 36° E., from the upper forks of the Codroy towards the Cairn mountain on Flat Bay brook, crossing the Barrachois at the lakes and striking for Hare Head at the head of the Grand Pond. Between the hills and the southern coast of St. George's Bay the land is level or undulating, for the most part, thickly grown over by a fine growth of mixed forest timber, and drained by numerous streams, several of which, besides the two already described, are navigable for small boats or canoes for several miles inland. This tract is bounded on the south-west by the high land of Cape Anguille, which rises into a wooded mountainous country about half way between the Cape and the head of Flat Bay, extending across to the southward to the northern main fork of the Great Codroy River. The maximum width of the level region between the sea and the long range is from ten to twelve miles, but this width decreases advancing to the north eastward, and is reduced to about five miles opposite the Cairn Mountain, while it becomes narrower still at the Barrachois brook.

By a rough measurement made upon the plan the area of the region lying between the mountains and the sea is about one hundred and ninety two square miles, or one hundred and twenty-two thousand eight hundred

and eighty square acres, a very large proportion of which is available for settlement. On the north side of the Bay St. George, also, there is a considerable area of fine agricultural country, extending from the coast between Indian Head and the isthmus of Port-a-Port, to the range of the Table Mountains, roughly estimated at about ten miles in length by an average of three in breadth, or about thirty square miles, equal to nineteen thousand two hundred square acres. The present settlement of this fine region is limited to some straggling farms along the coast on either side of the Bay, on which however excellent crops of grain grass, potatoes, and turnips are raised; winter wheat has been grown successfully on Mr. Romain's farm on the north side of the Bay, and the hardier varieties of that grain might no doubt be cultivated to a large extent, were there a mill in the country to make it into flour; and as there is ample water-power upon every brook, these would readily be constructed if an impetus was once given to purely agricultural pursuits. Many of these small farms even now maintain good stock of cattle, sheep, horses, pigs, &c., &c., the condition of all of which gives ample testimony to the capabilities of the soil on which they have been raised.

The Humber Arm and River.

Considerable discrepancies were found to exist in the position of this coast as represented in the published charts, especially towards the mouth of the Humber River, where there was found to be an error of upwards of two minutes of latitude; and as one prominent position where observations were taken—namely, the gravel point in Lark Harbour—agrees with the result obtained by M. Cloue at the same place within a few seconds, the outline given upon the accompanying plan may be relied on as tolerably near the truth.

Brake's Landing at the entrance to the Humber River was found to be in latitude 48° 57' 53" N. and longitude 57° 55' 32" West. The following are the bearings and distances, exclusive of minor turns up its course, as far as surveyed.

1st. Course.—From Brake's Landing to the head of the lower rapids, at station 9, S. 61° E., distance three miles and four chains.

2nd. Course.—From station 9 to entrance into Deer Lake, N. 60° E., distance eight miles and sixty-three chains.

3rd. Course.—Deer Lake from Governor's Point to head of Lake, N. 42° E. distance fifteen miles and seven chains.

4th. Course.—Head of Deer Lake to forks of Grand Pond, N. 44° E., distance five miles and fourteen chains.

5th. Course.—From Grand Pond forks to Beaver Pond, N, 38° E., distance four miles and twelve chains.

6th. Course.—From Beaver Pond to Great Bend, N. 56° E., distance eight miles and forty-six chains.

The upper part of the arm towards the entrance to the river is very shallow over a large area, much of which becomes nearly dry at low water; but there is a deep channel, although somewhat tortuous, by which small vessels can enter the stream: and there is very good anchorage outside the shoals a little way westward of Brake's Landing.

The first or lower course of the river passes through a narrow gorge bounded on either side by lofty calcarious crags, which in some parts rise nearly vertically from the water's edge in cliffs of one thousand feet or more, the whole body of the magnificent river being pent up within sometimes less than a chain in width. The current is tolerably strong and

water deep in this course, and towards the end of it there is a moderately strongrapid. Above this rapid the river opens out wide, flowing through a very picturesque valley, the current being moderate all the way until within about a mile of the lower end of Deer Lake, where another pretty strong rapid occurs. The rise from the sea to the level of Deer Lake was estimated to be only about ten feet. Following the course over Deer Lake to the junction with the Grand Pond branch, the current is sluggish, the river wide, sometimes opening to upwards of a quarter of a mile, the water usually deep, and is very easily ascended by boats of any ordinary draught. A little way above the junction of the Grand Pond branch the stream becomes very turbulent, the first rapid making a fall of eleven feet in about a quarter of a mile, and it is more or less rapid and often shallow and difficult of ascent for canoes all the way, except at two parts, where it opens into what is called the Seal Pool and Beaver Pond where it is still wide, and deep. There is also a stretch of some two miles, where the current is moderate, below the great bend, above which it turns up in a south and southwest course for about a mile, and then, bending round again in the prevailing north-eastern direction for another mile and a half, comes to a vertical fall of about ten feet, where our ascent terminated. The estimated rise above the sea at the top of the fall was about ninety feet. Above the fall the general course is said to be a little eastward of north for about eight or nine miles, where it reaches within less than ten miles of the head of White Bay: and then, turning westerly for a few miles, runs along the base of the mountains, and finally turns south-westerly and terminates at Adee's Pond, within about twelve miles distance from the head of Deer Lake, and some twenty miles from the eastern arm of Bonne Bay.

The Grand Pond branch was only ascended for a little over a mile, at the end of which distance the stream becomes violently rapid, and although practicable for canoe navigation all the way to the Grand Pond, it is exceedingly difficult and dangerous*

The hills at the lower reach of the river, although very precipitous and broken, are nevertheless covered by a dense growth of forest trees, among which are many pines and spruces of large size, well adapted for spars or lumber.

*Judging from the description given of these rapids, the rise must be at least about thirty-eight feet; therefore allowing about two feet for the fall of the stream from the forks to Deer Lake, and ten feet as the height of Deer Lake, the Grand Pond will be about fifty feet above the sea, instead of thirty-six feet as given last year; and all the other heights on the west side of the water-shed will be also proportionally higher than represented.

Above and immediately upon entering the 2nd reach, the valley opens out with a narrow fringe of fine flat land on either side of the river, lying between it and the mountains, which varies in width and extent to Deer Lake; while at Deer Lake it expands gradually more and more, and on the northern side it is in some parts upwards of three miles wide. The southern side is more contracted until reaching towards the upper end of the lake, where a great expanse of flat or rolling country spreads away to the eastward and northwards, reaching in the former direction to the Grand Pond. Above Deer Lake the flat country is of great breadth, more particularly above the forks; the mountain range which bounds it on the west side pointing in the direction of Adee's Pond at the head of the river on one hand, while on the other it extends to the base of the low wooded range west of Sandy Pond, and this level tract extends upwards on the river's course to the western bend, which is said to be less than ten miles distant from the head of White Bay. By a rough measurement of this large tract of country made upon the plan there would be an area of about four hundred and twenty-nine square miles, or two hundred and fifty-six thousand square acres, at least one half of which is probably well adapted for raising almost every kind of agricultural produce.

Independently of its agricultural capabilities, this fine tract of country seems to present inducements for other branches of industry and enterprise, in the quality of its timber, much of which is excellent. Tamarack or juniper is not rare; yellow birch of large dimensions is abundant; white pine and spruce grow in the greatest profusion, frequently of a size and quality not greatly inferior if not equal to the best that is now largely brought into market in Gaspe and other parts of the lower province of Canada. The natural facilities this part of the island present for communication also from shore to shore are very great, the valley is easily accessible by water from the Bay of Islands to the Grand Pond forks, while the country further north is well adapted for laying out roads, and a road of less than ten miles from the northern bend would open up the whole from the head of White Bay.

Water power to drive machinery is everywhere obtainable, either in the main river as on the upper part of the stream, or in the numerous brooks that fall into Deer Lake and the lower reaches.

Thousands of square miles of country have been laid out in townships and already partially settled in Canada either for purposes of lumbering or farming, on the northern shores of lake Huron and many parts of the lower province, far inferior in most respects to this region of Newfound-

land, which there can scarcely be a doubt is capable of supporting a very large population.

The mountains of the region, although very rugged and usually barren at the summits, do not reach in any case a very high elevation. The range known as the "Blow-me-downs," which runs to the water's edge, destitute of timber from top to bottom, opposite Harbour Island at the entrance to the arm, appears to be the highest, one summit of which was found by triangulation to be two thousand and eighty-six feet above the sea. Near the river the most conspicuous of the hills, and apparently about the highest, is Mount Musgrave (called so in honor of Your Excellency's recent visit to this part of the country), which, towering over the lower ranges towards the mouth, and bearing directly on the line of the lower reach, attains an altitude of eighteen hundred and sixty-four feet. Further inland and towards Deer Lake the general heights are still more moderate, the highest measurement being only ten hundred and forty-one feet over the level of the lake.

In entering on the geological part of the subject, I shall in the meantime confine my remarks to an account of the general distribution of the carboniferous series, and to the geographical and geological position of the various economic materials which have come under my notice, deferring a more minute detail of the facts and circumstances ascertained, until the collection of specimens already forwarded to Montreal have been duly examined and analyzed, when I shall be prepared to send in a report to Sir W. E. Logan.

Distribution of the Carboniferous Formation.

The rocks recognized as belonging to the carboniferous age occupy three distinct areas, being separated from each other by ridges of the older formations upon which they unconformably repose. For convenience they may be classed as the St. George's trough, the Port-a-Port trough, and the Inland trough of the Humber River and Grand Pond.

The south-eastern edge of the St. George's trough follows the base of the Cape Ray or long range of Laurentian mountains from near the entrance of Tranvain brook in nearly a straight line towards the upper forks of the Great Codroy River, and then, apparently still keeping towards the base of the mountain range to the Cairn mountain in Flat Bay brook, crossing the Barrachois brook, a little below the lakes, and striking for the arm of St. George's River. The northern edge of the same trough appears to be partially divided by a mass of crystalline metamorphic rocks, the age of which has not yet been satisfactorily ascertained, which forms a sharp ridge of hills terminating at Indian Head, on the west side of which the out-crop of the formation sweeps round towards the base of the Table Mountain Range of Lower Silurian limestone, and runs out on the shore a mile west of Romain's brook near the isthmus of Port-a-Port.

The Port-a-Port trough is divided from the St. George's trough by a ridge of Lower Silurian limestone, which extends along the coast across the measures from Cape St. George to a point nearly opposite to Red Island. Red Island is all a coarse conglomerate of carboniferous age, and from it the outcrop was supposed to strike easterly across the peninsula of Port-a-Port into Port-a-Port Bay, the whole country to the north of which was supposed to belong to the same formation, except the high land called Round Head, which probably protrudes through it. The flat valley of Coal River is also probably spread over by rocks of carboniferous age, but was not examined.

The western outcrop of the Humber trough strikes inland from the lower end of Deer Lake, resting against the eastern flank of the long range of Gneissoid mountains which run on their northerly course towards Adee's Pond at the head of the river and then along the left bank of the river towards the western shores of White Bay. The eastern outcrop runs along the edge of the upper end of Deer Lake making a narrow fringe between the lake and gneissoid mountains until within about a mile of its

head, when it sweeps round to the eastward, toward the Grand Pond, resting on the flank of the Laurentian hills which constitute the nucleus of the ridge between the two great lakes. The remainder of the outcrop of the inland trough within the Grand Pond country, has already been described in a former communication.

The coast between Cape Anguille and Larkin's Point, at the mouth of the Little Codroy river, displays some fine exposures of this formation. Between Cape Anguille and Codroy Island the exposures consist of strong beds of dark grey sandstone, dark blue or blackish limestone, coarse conglomerate, and a mass of black indurated shale, with ~~their~~ seams of snowy gypsum interstratified with beds of limestone and calcarious sandstone. The western side of Codroy Island exhibits a section of dark grey sandstone, in thick beds, sometimes of conglomerate character, the pebbles arranged parallel to the stratification, with brownish and dark blue, hard, compact, slightly calcarious sandstones, some thin bedded greenish coarse-grained micacious sandstones, with brown arenaceous and micaceous shales; while on the eastern side, at the point of the cove, some beds of hard dark blue limestone alternate with brown, yellow weathering sandstones in thin beds. In mostly all of the above mentioned strata, comminuted and carbonized plants were observed, in some cases in great profusion, especially among the softer sandstones and shales; and at the northern end of Codroy Island an accumulation of vegetable remains of about two inches thick may be styled a thin seam of coal.

The coast southerly from Codroy Island displays cliffs of red and green marls, with thinnish beds of black or dark brown, sometimes nodular, limestone, associated with which are vast masses of gypsum; the strata very much corrugated, contorted and broken, especially at the immediate contact with the gypsum, which sometimes contain great fragments of beds of limestone enclosed within the gypseous paste. Towards Woody Cape the high precipitous cliffs consist of green and reddish calcarious sandstone, with greenish, black and dark blue frequently nodular limestone and calcarious shales in nearly vertical strata. Fossil shells were found in some of the calcarious beds; calamites and other plants are abundant in some of the sandstones.

Between Woody Cape and Stormy Point the gypseous masses with their associated measures are again brought out on the coast, the strata being sharply folded over and repeated; beyond Stormy Cape the older strata are concealed up to the entrance to the Great Codroy River. In

consequence of the numerous folds and reootitions by which the rocks are affected between Cape Anguille and Stormy Point the thickness of the accumulation remains somewhat uncertain.

On the coast between the Great and Little Codroy Rivers a section of the measures was obtained in pretty regular sequence, consisting of green and red conglomerates, sandstones, red and green marls and red, green and black shales, the whole accumulation of which amounted to a thickness of two thousand three hundred and six feet. All this mass of strata is very micaceous, and most of the beds are more or less characterised by the presence of carbonized plants,—in some parts the carbonaceous material derived from an accumulation of them being found packed in irregular beds and nests: but in no case did there appear to exist anything like a workable seam of coal.

The course of the Great Codroy River runs a little obliquely across the lower portions of the measures, the calcarious parts, with masses of gypsum, coming out on Ryan's brook a little way back from the estuary; while the limestones were observed on or near the right bank of the river both above and below the falls, and further on crossing the 1st fork about a mile and a half above the junction of the streams.

The measures both on the coast and the river sections were found uniformly to dip to the south-eastward (except where a few small disturbances occasion a slight break or undulation), toward the Cape Ray range of mountains, until within a very short distance of the gneiss, where they were usually either highly tilted, inclining in the opposite directions, or vertical. Thus disturbances were visible on the coast near Trainvain brook, on the banks of the streams near the mountains in the neighbourhood of the 1st fork, and at the junction of gneiss above the 2nd fork, affording evidence of a great break or fault, which shall presently be more particularly referred to.

The high land of Cape Anguille runs upon the axis of an anticlinal, the north-eastern extension of which is mentioned by Mr. JUKES as crossing the 1st and 2nd brooks in the country about three miles from the coast of St. George's Bay. On both sides of the Cape the rocks are disturbed, but are more conspicuously so on the St. George's Bay side, where the cliffs show many complicated contortions; and whether any other formation may protrude through the carboniferous on or near the crown of the anticlinal arch has not yet been ascertained. Mr. JUKES also mentions the recurrence of the gypseous masses and associated rocks, resembling those of Codroy, on either side of the anticlinal on the 2nd brook, and at

eight miles from the coast he states having seen a bed of coal three feet thick, which however was not traced. At about that distance from the coast there is reason to suspect that the great fault already alluded to may have the effect of cutting off part of that seam and bringing the lower measures once more to the surface on the south-eastern side.

Evidences of the presence of the gypseous part of the formation were perceived near the base of the mountains a short distance to the westward of the Cairn Mountain, where a set of enormous cavities, resembling inverted cones of almost perfect symmetry, sometimes nearly one hundred and fifty feet in diameter at the surface, with a depth of from sixty to eighty feet to the apex of the cone, in the strike of which some fragments of Gypsum were found on the bed of a small brook which falls into Flat Bay brook just before it enters the gorge of the mountain range. A coarse conglomerate was also observed on this brook associated with bright red marls, and some small fragments of coal were found strewed at a few parts along its bed and banks.

Coarse conglomerate is exposed upon the banks of Flat Bay brook dipping irregularly to the eastward, which apparently strikes across to Flat Bay, where, with a north-easterly inclination, it rests upon beds of limestone; and at the mouth of Flat Bay brook beds of limestone are exposed, with red marls and conglomerate beds resting on them, which dip to the northward.

The mode of occurrence of the lower measures of the formation, with the associated masses of gypsum on the north side of St George's Bay, were described in the narrative of last year. A fault is there represented letting down a confused mass of carboniferous limestone among the limestones of calciferous age inside of Port-a-Port Bay, and a calcarious vein holding galena is represented as indicating the position of the dislocation. The effects of this fault were observed again this season on the outer coast near Red Island, where limestone holding fossils of carboniferous age were found entangled with Silurian strata, the rocks being thrown down on the northern side, while patches of flat beds (which however were not accessible) resting in unconformable relation to the upturned strata of the cliffs were supposed to be of the same formation. The disturbances which affect the cliffs on the main land at this part do not reach Red Island, which is of a coarse red conglomerate, with intercalations here and there of great lenticular masses of coarse brown sandstone. The cliffs on the south side of the island attain an altitude of well nigh three hundred feet, while at the northern extremity they are not much over one

hundred feet, shewing a gentle inclination very regularly to the northward.

The flat land of the peninsulas between the sea and Port-a-Port Bay was considered from the aspect of the country to be spread over by the arenaceous and calcarious rocks of the lower portions of the carboniferous formation; but in consequence of the accident to myself, which occurred while on this part of the coast, it was not visited.

At Deer Lake the formation is again recognized on the west side, in some strong beds of coarse conglomerate dipping at a very small angle to the north-eastward, which line the lake shore, a little way north from the Island near the lower end of the lake; and by numerous large angular slabs of red, green, and brown sandstone which are strewed abundantly on the banks and shores further up, and are exposed in low cliffs on a brook called Coal Brook, where the strata is nearly horizontal. On the eastern side of Deer Lake the conglomerate is exposed with some beds of limestone at its base, turned up vertically, or inclining at a very high angle towards the lake, striking along the shore and resting against the gneiss of the mountains, the disturbance being evidently connected with a fault running in a north-easterly direction, with a down-throw on the north-west side. Above the forks of the Grand Pond branch the banks expose strata of very bright red sandstone with bright red marls, usually quite or nearly quite flat, until within a short distance of the lower or John's Fall, where the rock consists of brownish and red sandstone in thickish beds which are somewhat tilted with a dip towards the north-west. At John's Fall the rock is a coarse conglomerate with red sandstone, the former in beds sometimes upwards of five feet thick which is underlaid by black and greenish calcarious shale. Above John's Fall the banks, which sometimes are upwards of thirty feet high, exhibit black and greenish calcarious and argillacious shales, interstratified with beds of dark grey nodular limestone, varying in thickness from one to seven inches, in nearly horizontal strata, which continues to be exposed up the long reach at the great bend and on either side of the river to the foot of the upper fall, where they again dip below the coarse conglomerate, inclining at a moderate angle up the river to the north-eastward showing a flat anticlinal between the two falls.

There appears to be evidence to shew that the great fault, of which mention has been made as affecting the strata in the Great Codroy valley, intersects the Island diagonally from shore to shore, running in an almost perfectly straight line from near the entrance of the little Codroy River to White Bay.

The coal rocks were perceived to be disturbed along the base of the Cape Ray mountains, wherever visited, from Trainvain brook to the upper forks of the Great Codroy, at the base of the hills near the Cairn Mountain on the east side of Deer Lake, and near John's Fall on the Humber—while the Silurian limestones at the head of Spruce brook, which are directly in the line of the dislocation, are much disturbed, and the coarse conglomerates of Miller's Island and the western shores of White Bay are turned up vertically. The value of this fault was not accurately ascertained, but as in some parts, as at Trainvain brook, it seems to bring up strata low down in the coal formation against measures which may be assumed to be three thousand feet higher in the formation, it may be equal to that amount and probably more.

I have been thus particular in describing this dislocation, not simply as a feature of great geological importance, but as materially affecting the probability of workable seams of coal being found to exist in the coal measures of the interior. There is no doubt a very considerable breadth of country spread over by coal measures between Sandy Pond on the one hand and Adee's Pond and the Laurentain Mountains on the other: but the strata being mostly flat, as has been shewn in the valley of the Humber, and an upthrow fault occuring on the Sandy Pond side of the trough bringing lower measures to the surface on the eastern side of the dislocation, it is not unreasonable to infer that the whole or greater amount of strata consists of lower members of the formation, in which, so far as at present known, seams of workable coal do not appear to exist.

Economic Materials.

The economic materials observed during the season, at various parts, were Copper, Lead, Iron, Plumbago, Building Stones of Granite, Sandstone, and Limestone, Limestone for burning, Whetstones, black, white and variegated Marbles, Serpentine, Gypsum (white and grey), Red Ochre, Shell Marls, Peat and Clay.

Copper Ore.

A beautiful sample of vitreous grey copper ore was obtained from Rock Cove, near Grandy's Point in Placentia Bay, which appears by the description given of the locality to run in veins; and indications of similar ore, together with native copper, are reported to exist at various parts in Fortune Bay: copper was also observed associated with other minerals at the La Manche mines in Placentia Bay. At this place it is chiefly indicated by the presence of green carbonate of copper diffused through the calcarious matrix of the vein, and nodules of malachite occur usually near the walls of the lode.

Lead.

Crystals of galena were observed in quartz veins, cutting the gneiss of the island, on Deer Lake, and on the point of the main land opposite. The rock at this part is chiefly mica slate constituted for the greater part of fine grains of white quartz, and small scales of silvery mica; small coarse garnets and cubical iron pyrites are sprinkled through the mass in abundance. The strata are cut by numerous veins of semi-translucent white quartz, the largest of which is about three feet wide, running in a north and south direction, with numerous smaller veins radiating from it east and west. A few specks of galena were observed in the main vein, but it was chiefly in the smaller ones, that the ore seemed to occur.

At Parrody's Head, near the head of the Bay Despair, galena was found in white quartz veins through which calc-spar is disseminated, but not in large proportion. These veins run irregularly, intersecting black plumbaginous occasionally slightly calcarious slate, which was supposed to be of lower Silurian age, and is the rock of the country over a very large area of the surrounding region.

The La Manche mine is situated near the north-eastern extremity of Placentia Bay, between Little Southern Harbor and Little Bay. The vein that is worked for lead varies in width from three to six feet, and is chiefly of calc-spar, much of which is tinged of a pale pinkish amethystine color. Sulphate of barytes, quartz and fluor spar are more or less distributed

through the vein, the walls of which are frequently lined with beautiful crystals of amethystine quartz, and occasionally with green or blue malachite.

The ore is distributed irregularly through the whole thickness of the vein, sometimes in "veeghs," as termed by the miners, or pockets; but there appears to be also a pretty regular and continuous string of ore near the middle of the lode, of from one to four inches thickness, from whence the "prell ore," as it is termed, is derived. The run of the vein is about N. 63° E. from the water's edge, and its altitude vertical, maintaining that course and altitude with great regularity, and being traceable on the surface for a considerable distance. The lode cuts a set of green, very hard and brittle compact cherty or jaspery slates, which cleave exactly with the bedding and for the most part weather an opaque white, which discoloration extends into the stone for an inch or more. The dip on the south-eastern side of the lode is about N. 27° W. ∢ 25°; that on the north side points in the same direction but with an increased rate of inclination. From the position of the vein to the entrance of Little Southern Harbour the measures gradually accumulate upon this dip, but as there are several dislocations observed in the cliffs it is probable the same strata may be repeated. A considerable amount of red strata are visible in the cliffs, of a hard jaspery character, alternating with rock of a dark bottle-green color, having the aspect of diorite; but being incapable of landing to examine that part of the coast I am unable to state the mineral characters with certainty.

It will require much further investigation to determine with any amount of certainty the geological horizon which these rocks may represent; but it may be stated that the mineral character and general aspect of the strata bear a very strong resemblance to the rocks at the Topsail cliffs in Conception Bay, where the evidence tends to show that rocks of lower Silurian age succeed them unconformably. Indications of lead ore, moreover, have been perceived near the coast between Topsail Head and Portugal Cove; and more recently the same ore has been found in veins intersecting the slates and sandstones in the immediate vicinity of St. John's*

*I was informed at the La Manche mines that the amount of ore shipped during the years 1858-59 amounted to 2,354,987 lbs., or 1049 2227-2240 tons.

Iron.

Near the junction of the coal measures with the gneiss on the Great Codroy River some bands of a very ferruginous character were observed, interstratified with the latter rocks. These bands are of a reddish brown color, are hard, brittle and with a conchoidal fracture, the broken surfaces presenting occasionally a metallic lustre.

Much of the gneiss in this locality is of a bright red color which is derived from the prevalence of bright red orthoclase fellspar, over the other constituents, which consist of small grains of semitranslucent white quartz and small scales of mica.

In this locality, and for some distance down the stream, large slabs and fragments of pure white crystalline limestone, with specs of graphite and silvery mica, were observed to occur in abundance; from which circumstance it was assumed that strata of that character must rest *in situ* somewhere among the Laurentian Rocks further into the interior.

Some beautiful specimens of magnetic Iron ore were procured from the neighbourhood of the Cairn Mountain near Flat Bay brook, which, judging from the quantity distributed over the surface of the ground, is probably derived from a large and important mass in that neighbourhood. The rocks with which the ore seems to be associated are of an opaque white color, for the most part, being chiefly composed of white orthoclase fellspar with quartz, in a small proportion, and Labradorite.

Plumbago.

This mineral was found to be pretty generally disseminated in a set of black shaley slates on the islands and main shores towards the head of the Bay Despair. On the north side of Richard's Island it has been taken out in considerable quantities by the neighbouring residents for usual household purposes, and it was observed to occur in the same rocks on the banks of the brook by the Indian settlement, at the entrance to the Conne River. The mineral appeared to be in the greatest abundance where the strata were affected by cracks or dislocations, which, on Richard's Island, Isle Bois and the northern side of Long Island, are of frequent

occurrence. The age of these plumbaginous slates is doubtful, but it was considered probable will prove eventually to be lower Silurian, and may be the equivalent of the slates and shales of Manuel's Brook and the islands of Conception Bay.

The slates in Bay Despair are usually more or less calcarious, and are intersected by veins of both calcspar and white quartz.

They usually display a fibrous structure with a silky glistening surface, sometimes covered over by remarkable crystals and abounding with decomposing iron pyrites.

Gypsum.

Gypsum abounds in the lower part of the carboniferous system, and is largely developed on the coast near Codroy and in the Bay St. George. The vast masses which come out in the cliffs between Codroy Island and the Great Codroy River, can hardly fail to prove some day of very great value and importance. The color of the greater portion of the masses on the Codroy side of Cape Anguille is grey, and usually presents a regularly laminated appearance by the presence of thin scales of a black substance which alternates with the soft white gypsum: but there are portions very white also, and the associated marls are frequently streaked with those seams of snowy fibrous gypsum. The little Harbor on Codroy island is sufficiently favorable shelter for small vessels, and the Codroy Roads, having a fair anchorage for larger sized craft outside during the summer months, there does not appear to be any great difficulty to overcome in having these great deposits opened out to commercial enterprise. Large quantities of gypsum are annually taken for the Lower Canada market from the Magdalene Islands, where probably the facilities for working the material are not greatly more favourable than in this part of Newfoundland.

The great mass of gypsum at the entrance to Romain's brook was described in the narrative of last year's exploration. It is chiefly pure white, and is admirably suited for stucco purposes; but the want of shelter for vessels at that part, offers a considerable obstacle to the shipment of the material. The gypsum of the south coast of St. George's Bay and in the interior I had no opportunity of visiting.

Marbles.

The fossiliferous limestone of Topsail Head takes a high polish and affords a very handsome description of variegated marble, some cubes of which were sent to be shewn as specimens at the ensuing exhibition at Paris. Some of the variegated red and white beds of limestone near Cape St. George are likely to yield a good and ornamental material, and one strong pale drab-coloured bed which comes out in the cliffs nearly opposite Red Island, is particularly fine in grain, takes a very high polish, and might be taken in blocks of any size under five feet in thickness. This bed seems to be of very pure lime, and is sometimes upwards of seven feet thick. The position of this stratum of rock, however, cannot be said to be favourable, asthe only anchorage near is under the beach at Red Island, which affords shelter from northerly winds only; but as it strikes inland and probably runs across to the Port-a-Port side of the peninsula, it is possible enough some parts may be found where it might be quarried to advantage.

Marbles of various kinds occur at certain parts of the Bay of Islands. The cliffs at the entrance to the Humber River yield white, black and variegated red and white limestone, a large portion of which is capable of being used for many ornamental purposes, although so far as I have yet been able to ascertain, the white variety seems usually to be too coarsely crystalline for statuary purposes. Just below the lower rapids a vein of compact calcarious spar between two and a half and three feet wide may be seen on the right bank of the river cutting the strata and running up the face of the cliff with great regularity, and many more similar veins occur on both sides both above and below. Some white and variegated marble has been obtained from this large vein which, although susceptible of giving a smooth surface, is mostly too coarse in texture to be considered of high quality as an ornamental stone; but I am informed by Mr. Makim of this place that higher up the hill, near where this vein comes out, a pure white marble may be obtained from *beds* which may prove to be of more importance. Some beds of black limestone of very fine grain, hard and compact, the exposed surfaces of which are sometimes characterised by obscure silicified organic remains, occur also in the lower reach of the Humber River, which are capable of receiving a fine polish, and at a place called Cook's Cove, on the south side of the Humber Arm, a beautiful and homogeneous sample of jet black marble was obtained from a bed about six inches thick, and in immediate contact with a conglomerate limestone.

Still another variety of marble may be found at York Harbour, where a great mass of Serpentine, which forms an adjacent range of hills, comes to the water's edge. Some specimens were obtained from this locality and sent with others of the collection for exhibition; but as these were derived from broken fragments of the exposed outcrops, they can hardly be taken as fair samples of the general quality of the rock. The color is a dark bottle green, with black and sometimes white streaks; but the rock being brittle and a good deal shattered, probably by the influence of the weather, the surfaces polished were not very satisfactory. A beautiful specimen of serpentine however was produced for exhibition by C. F. Bennett, Esq., from Little Bay, near the Terra Nova mine.

Building Stone.

Granite.—A very coarse dark reddish granite occupies a considerable portion of the coast at La Poile, the prevailing color being derived from large irregularly formed crystals of red fellspar, which usually give the exposed surface the aspect of a conglomerate when viewed at a little distance. A finer grained quality of granite is found to intersect the coarse mass, sometimes of a red and at other times of a whitish grey color. The coarse variety is very hard, tough, and endurable, and would doubtless have a grand and imposing effect in large and massive structures. The age of the coarse grained rock is undetermined; the intersecting veins however penetrate into a set of blackish or dark blue and greenish slates which come against the granite at Little La Poile, indicating a more recent origin than the slates which are probably lower Silurian. An exactly similar coarse granite was observed in 1864 at the other extreme of the island, at Cat Cove near Cape Freels.

A beautiful variety of granite occurs at Rose Blanche, where there is an excellent small Harbour, about twelve miles west from La Poile. The color of the rock, is ot a whitish grey, it is rather fine grained, and is constituted of white quartz, white fellspar, and brown mica. Blocks of this granite are easily procurable in almost any requisite size all along the shore, and in inexhaustable quantity.

Sandstones.—A good material for building may be procured in ample abundance from the sandstones of Kelly's Island, in Conception Bay. The stone is usually of a greenish tinge, sometimes weathering yellowish; some beds are very hard and difficult to dress with the hammer; others are freer in the grain, and dress with facility. The sandstones of Kelly's Island rest upon a set of brownish shaley slates; and beds of that description are interstratified with them. Portions of the measures are slightly calcarious, and most of the sandstones are somewhat micaceous. The horizon of these rocks, together with the slates and limestones of Manuel's Brook and Topsail Head, is supposed to be low down in the Silurian system.

Admirable building stone is obtainable at many parts from the sand stones of the carboniferous rocks: instances of which may be specified as occurring on Codroy Island, in the section between the great and little rivers Codroy, and on the Great Codroy River. The rock on Codroy Is-

land, where the bands are thick, is frequently slightly calcarious, and is very hard and compact; the centre part of the bed being of a pale bluish grey on fracture, while the exposed surfaces weather of a drab or yellowish color. Some of the beds south of Codroy River are a drab freestone slightly coarse in grain, and always more or less micaceous: yielding a handsome material which is easily worked. Beds of this description were also observed in several parts on the banks of the Great Codroy River.

WHETSTONES AND GRINDSTONES:—Some of the sandstone beds of the coal formation on the Great Codroy River, near the falls, and at one or two places in the coast section, would produce good scythe stones; and near Cape Anguille, pieces of a slightly calcarious slate of the very finest texture, very hard and of a dark grey color, were found of excellent quality as hones for knives, and are probably well adapted for finer tools or instruments. Many sandstone beds of the coal measures might be used for grindstones; some of the best hitherto observed were found on the Grand Pond, near the foot of Old Harry Mountains; while at Whetstone Point on the opposite side of the same lake, scythe and caurse hone-stones in unbounded quantity may be picked off the beach or worked out of the adjacent cliffs.

LIMESTONES.—The cliffs of Cape St. George and the coast north from it are apparently more or less magnesian in quality: but beds occur of very pure lime at some parts, among which may be enumerated, in particular, the pale drab stratum, already alluded to under the head of marble. Some of the dark colored bituminous and fossilferous beds of the calciferous formation, such as those that skirt the coast inside the isthmus of Port-a-Port, are no doubt of good material for burning.

Many beds in the cliffs of limestone at the entrance to the Humber River, which are supposed to be chiefly of the calciferous age, may be found to possess all the requisites for burning into lime; and some of those which outcrop in the Humber Arm at Cook's Cove and other places, associated with limestone conglomerate, may also be found available for the same purpose.

The limestone beds in the lower coal measures also are probably capable in many instances for making good lime, examples of which may be instanced as occuring on the coast near Codroy, and thence cropping out at intervals near the right bank of the Great Codroy River, particularly at Ryan's Brook, where there is a considerable thickness of this rock exposed, associated with sandstone and masses of gypsum.

A limestone occurs at the entrance to Ship Cove, at Burin, on the west side of Placentia Bay, which was supposed to be the equivalent of the rock of Topsail Head; and very low down in the Silurian System.

It occurs in two bands, one from fifteen to twenty feet thick, the other from thirty to forty feet, divided by black calcarious shales, and overlaid by similar shaly and slaty strata, containing a brown material supposed to be an oxide of manganese, with which the surrounding parts are discolored. The color of the limestone on fracture is pale blue, weathering drab on the exposed surfaces, some of which exhibit obscure forms supposed to be organic, probably fucoids. This rock has been quarried to some extent for the purpose of burning into lime.

Red Ochre.

This material is derived from the red marls of the coal measures, and has been frequently used by the inhabitants near the coast of St. George's Bay, as a red paint and as red chalk. It was observed upon the banks of the Flat Bay Brook, and on the Humber River above Beaver Pond. It is also reported to be found on the banks of the brooks between Flat Bay and the high land of Cape Anguille.

Clay.

At the extreme head of the Bay, at the entrance to the Conne River, there is a deposit of stiff blue regularly stratified clay, apparently quite free from lime, which probably may be found fit for the manufacture of either common or fire bricks; and possibly for some pottery purposes. A rude attempt was observed to have been made to burn bricks upon the spot which did not appear to have been successful, probably in consequence of want of proper appliances. When burned it becomes an Indian red color.

Shell Marl and Peat.

Peat is extensively spread over the flat country of the Codroy most of the way; and at Capelin Cove it forms the upper part of the bank in a thickness at some parts of five feet or more, resting upon a bed of shell marl, which in its turn is underlaid by another bed of peat from six to ten inches thick. The shore banks between Flat Bay and the gut also are capped with peat, and the same is probably the case over a great part of the flat coal measure area, which has not been visited. The value of this substance as a fuel need not be commented upon.

A deposit of fresh water shell marl was observed on the coast of St. George's Bay, between Romain's brook and the isthmus of Port-a-Port, about half a mile from the former.

The deposit is not very extensive, but of considerable thickness; it is white and contains Planorbis and other fresh water shells, and rests on

a bed of sea-weed about eighteen inches in thickness, which reposes on clay with pebbles and small boulders.

The bottom of the bed of sea-weed is about twelve feet over high water mark. Shell marl is useful as an agricultural manure, and when sufficiently pure answers a good purpose as a white-wash.

Ornamental Stones.

Red, and green, and brown jaspers were frequently found on the shores of the Humber Arm, and in the valley of the Humber River: they were also observed in sundry places in St. George's Bay and on Flat Bay brook. These probably take their origin in beds or veins of lower Silurian age, but frequently occur as smoothly rounded pebbles in the conglomerates of the coal measures. The red jaspers in particular are frequently capable of taking a high polish, and might be cut into brooches, seals and other personal ornaments.

The Labradorite of Cairn Mountain, some cleavage planes of which are opalescent, reflecting various beautiful colors, when placed at a certain angle to the rays of light, may in some cases be found as a handsome ornamental material. Its prevalent color at this part is a pale yellowish white

The malachite found lining the walls of the vein at the La Manche mine, as far as my present information goes, has only been found in small quantities.

Petroleum.

This substance was reported as existing on Middle Point of Port-a-Port in my narrative of last year. Since then a sample of oil has been procured from the spot by C. F. Bennett, Esq.: but having been unable to visit that part I can give no further particulars as to the mode of its occurrence. Petroleum is now stated to have been discovered in the neighbourhood of Bonne Bay; but not having visited the locality, I am still ignorant of the conditions under which it is produced.

Quartz Veins.

Samples were taken of quartz veins from Deer Lake, Humber Arm, and Bay Despair which have been forwarded to Montreal for chemical analysis, the conditions under which they were found to occur giving reason to presume the possibility of some trace of the precious metals being discovered.

I have the honor to be
Your Excellency's most obedient servant,

Alexander Murray,
Geological Survey.

To His Excellency
Anthony Musgrave Esq.

ERRATA.

The Lines are numbered from the top of the Page.

Page 9—Line 12.—For "ports" read *parts.*
" 10— " 17.—Insert *and* after "erected in it."
" 11— " 14.—For "these" read *mills.*
" 12— " 11.—Insert "of the river" after distances.
" 12— " ——The courses should have been in tabular form.
" 12— " 31.—Calcareous should be spelt with an *e.*
" 13— " 1.—Insert *the* before water.
" 13— " 14.—Read *are* for "is" after "into what."
" 14— " 17. and 18.—256,000 square acres should be 274,560 square acres.
" 17— " 10.—For "these" read *their.*
" 17— " 11, 15, 30, and 33.—Calcareous to be spelt with an *e.*
" 17— " 16.—Micaceous should be spelt with an *e.*
" 18 & 19———Calcareous should be spelt with an *e.*
" 19— " 8.—After "where" insert *were*
" 20— " ——Calcareous and argillaceous should be spelt with an *e.*
" 20— " 14.—For "is" read *are.*
" 20— " 31.—Continues should be continue.
" 22— " ——Calcareous again.
" 24— " 4.—Omit "are."
" 24— " 7 & 20.—"Felspar" should have but one *l.*
" 24— " 23.—Shaly should be written without an *e.*
" 25— " 19.—For "those" read *their.*
" 25— " 20.—After "is" insert *a.*
" 25— " ——Calcareous again should be spelt with *e.*
" 26— " 25.—For "giving," read *receiving.*
" 26— " ——Calcareous again to be spelt with *e.*
" 28— " 3.—Felspar should have but one *l.*
" 28— " 20.—Inexhaustible should be spelt with an *i.*
" 28— " 26.—"Shaly" without an *e.*
" 28— " 26.—Calcareous to be spelt with *e.*
" 29— " —— Calcareous spelt wrong in two lines.
" 29— " 17.—For *course* read coarse.
" 29— " 24.—For "fossilferous" read *fossiliferous.*
" 29— " 30.—For "for" read of.
" 31— " 7.—Insert " of Despair" after Bay.